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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/648,118 | 08/25/2003 | Soon Shin Chee | X-1389 US | 3199 |
| 24309 | 7590 | 08/18/2005 | EXAMINER | |
| XILINX, INC ATTN: LEGAL DEPARTMENT 2100 LOGIC DR SAN JOSE, CA 95124 | | | HA, NATHAN W | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2814 | |

DATE MAILED: 08/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,118

Applicant(s)

CHEE ET AL.

Examiner

Nathan W. Ha

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 0623.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-11,14-20 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-11,14-20 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Cancellation of claims 2-3 and 12-13 is acknowledged.

Allowable Subject Matter

1. The indicated allowability of claims 3-5 and 13-15 is withdrawn in view of the newly discovered reference(s) to Rumer et al. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 11 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Rumer et al. (US 2004/0238947, newly cited, hereinafter, Rumer.)

In regard to claim 11, in fig. 2, Rumer discloses an integrated circuit having a heat sink 206, said integrated circuit comprising:

a substrate 202;

a die 204 positioned on said substrate; and

a conductive lid (also the heat spreader) positioned over said die and coupled to said substrate, said conductive lid having a foot portion at 222 extending from a top of said conductive lid and comprising at least one multi-diameter through-hole 216.

In regard to claim 15, see the below discussion regarding to claim 5, where in Rumer discloses different diameters of the whole.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-10, 16, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rumer et al. (US 2004/0238947, newly cited, hereinafter, Rumer) and in view of Tosaya et al. (US 6,538,320, previously cited, hereinafter, Tosaya.)

In regard to claims 1 and 16, in figs. 2 and 3, Rumer discloses a conductive lid 206 adapted to function as a heat sink (heatspreader) for an integrated circuit (die) 204, said conductive lid comprising:

a recessed portion adapted to receive a die 202;

a foot portion at the 222 having a surface adapted to be coupled to a substrate 112 of said integrated circuit; and

a through-hole 216 located in said foot portion, said through hole being tapered and adapted to receive an element to secure said conductive lid to said substrate of said integrated circuit.

Rumer appears to disclose some ways to attach the lid to the substrate such as rivets, gripping clips, threaded fasteners, and non-threaded fasteners. Rumer, however, does not expressly teach using an adhesive to secure the lid to the substrate.

Tosaya, in fig. 4, as previously mentioned, discloses an analogous package including a substrate 112, a cavity which includes a chip 114, and a lid 102, wherein the lid is attached to the substrate through the through holes by using adhesive 116 in order to establish a riveted connection and provide lateral securement of the heat spreader (col. 2, lines 60-67.)

Therefore, it would have been obvious to recognize that one of the ways to attach these devices as mentioned by Rumer to use adhesive as taught by Tosaya in order to establish a riveted connection and provide lateral secure of the heat spreader.

In regard to claims 4-5, 9-10, Rumer further discloses that the through hole comprises a multi-diameter holes such cylindrical portions, see fig. 2.

In regard to claims 6-7, regarding the processing limitations (injection, drilling, etc.), these would not carry patentable weight in this claim drawn to structure. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985). Rumer, however, discloses that the river is formed by mandrill, see [0020].

In regard to claim 8, wherein said foot portion extends around said recessed portion. See Rumer's figs. 2 and 3.

In regard to claim 9, Tosaya further discloses plurality of through-holes positioned in said foot portion. See also, fig. 3.

In regard to claim 10, wherein said plurality of holes are symmetrically spaced around said foot portion. See fig. 3.

In regard to claims 18 and 20, Tosaya discloses the resin in the through hole and between the substrate and the lid, fig. 4.

6. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rumer and Tosaya as applied to claims 11 and 16 above, and further in view of Murayama (previously cited.)

In regard to claims 17 and 19, Rumer and Tosaya discloses all of the claimed limitations as mentioned above except mention the material of the adhesive element. It should be noted that adhesive in this semiconductor area is normally formed by thermal adhesive resin since this material delivers heat from the inside through the heat sink. For instance, Murayama, in fig.2, discloses an analogous package that includes chip 14, heat sink 18, substrate 12. Murayama, further teaches the heat sink is attached to the substrate through thermal conductive adhesive 17 in order to transfer heat to the outside of the package. See also, [0053].

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention was made to recognize that the material of the adhesive in order to facilitate the process of transferring heat out of the package.

7. Claims 14 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rumer as applied to claims 11 and 15 above.

In regard to claims 14 and 37, Rumer discloses all of the claimed limitations as mentioned above except of the specific shapes as claimed in claims 14 and 37.

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the holes with a conical shape frustum shape because applicant has not disclosed that [these shapes] provide an advantage, is used for a particular purpose, or solve a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with either shape because they perform the same function of positioning the module to the substrate.

Therefore, it would have been obvious to one of ordinary skill in the art to modify Rumer to obtain the invention as specify in the above claims.

Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another

variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Arguments

8. Applicant's arguments with respect to claims 1, 4-11, 14-20, and 37 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

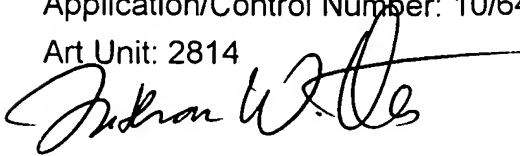
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read "Nathan Ha", with a long horizontal flourish extending to the right.

Nathan Ha
August 11, 2005